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ABSTRACT

Over 80% of the Taiwanese students who complete their graduate study in the United States do not return but instead stay to become members of American college faculties or to take jobs in research organizations and industries. The concept of the Taiwanese brain drain is described and how it developed and what the government has done to cope with it examined. After a review of the literature, Taiwan's educational system is reviewed, including information on education and migration. Separate chapters then cover the migration of intellectuals and the "pull" and "push" factors of Taiwan's brain drain into the United States. Governmental coping efforts are reviewed. Despite the considerable brain drain, the economic development of Taiwan over the past two decades has been remarkable, and the reasons for this are discussed. Taiwan is changing from a labor-intensive economy to one based on high technology, and from a newly industrialized country to a developed country. It is concluded that Taiwan needs its high quality personnel and intellectual resources even more, so its further prosperity depends on reversal of the brain drain and recruiting of highly trained talents abroad. Thirty-seven references are appended. (SM)

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The Pennsylvania State University

The Graduate School

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TAIWAN'S BRAIN DRAIN: A CASE STUDY

A Thesis in

Educational Theory and Policy

by

Shirley Hsiu-chu Lin Chang

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May 1988

HE 021 332

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ABSTRACT

Over the years, Taiwan has experienced "brain drain," as more than 80 percent of its students who completed their graduate study in the United States have failed to return. Instead, they have found their ways into the faculties of American colleges and universities or employment opportunities in various research organizations and industries.

This thesis examines what is brain drain, why it came about in Taiwan, and what the government has done to cope with it. One of the major findings of this study is that the elite emigration in Taiwan has been caused by a host of complex academic, social, economic, and personal factors.

Secondly, Taiwan's brain drain into the United States is primarily a case of "education and migration." It is an outflow of college graduates, not an exodus of high-class scientists and engineers; therefore, Taiwan's manpower loss in the short run is not as serious as the case where mature and experienced scientists and professionals leave. Furthermore, whereas a large number of college graduates leave each year to study abroad, a much larger number of the graduating class does remain in Taiwan.

As Taiwan is undergoing the transformation from a labor-intensive economy to one based on high technology, it requires more than ever high-quality personnel and intellectual resources. In fact, the

government has already implemented an ambitious program to recruit Taiwan's highly trained talents overseas.

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INTRODUCTION

Like other developing nations, Taiwan has experienced severe "brain drain." Over the years, Taiwan has lost valuable human resources, its well-educated and highly trained personnel, to the advanced industrial nations, particularly the United States. A large number of students from Taiwan (as from elsewhere) who completed their study in the United States have found their ways into the faculties of American colleges and universities or employment opportunities in various research organizations and industries. They chose to settle down in the United States because of up-to-date research facilities, good salaries, or a combination of these and other factors.

Industrialization and economic development have created a new need for highly trained personnel in Taiwan and the private sectors now offer salary inducements and other benefits to attract scholars, scientists, and engineers to return from abroad. Likewise, the government is implementing a series of measures (incentives) to induce and encourage students who have completed their study abroad to go back to Taiwan to work there.

This thesis examines what is "brain drain," why it came about in Taiwan, and what the government has done to cope with it. Specifically, Chapter I will discuss the definition of "brain drain" in the literature of educational studies and social sciences and examine various studies done on this subject. Chapter II will analyze the

development of Taiwan's system of higher education over the past decades and discuss the background that gave rise to the outflow of the highly educated from Taiwan. Chapter III will provide, when possible, statistical data on the college graduates leaving Taiwan for study abroad and explain the reasons. Chapter IV will identify factors which encourage Taiwan's intellectual migrants to stay in the United States, and Chapter V will analyze what has been done to arrest the outflow of the educated and what kinds of people who study abroad are returning to Taiwan.

This thesis relies heavily on published information, particularly the survey data issued by the Republic of China (ROC) government agencies.

Chapter I

THE CONCEPT OF BRAIN DRAIN: A REVIEW OF LITERATURE

Most studies of "brain drain" define the term as the migration of highly trained manpower from one country to another, often with a strong connotation of loss to individual countries of origin.[1] Writers are not in agreement on what the "brain" is. According to conventional use, the brain refers to engineers, natural scientists, physicians and surgeons, and college professors and precludes craftsmen and artists. Some writers even include professional nurses, but others, like Dr. Yung Wei, exclude nurses and include "lawyers, prominent artists and men of letters" in his definition of high-level intellectuals.[2]

As pointed out by several historians, the emigration of skilled personnel and scientists dates back to ancient history. When Plato established the Academy in 388 B.C. and Aristotle the Lyceum in 355 B.C., the first long-lived institution of learning and research in Athens, a large number of Greek scholars streamed to Athens. Around 300 B.C., the migration of scientists switched to Alexandria, as Alexandria was made into the new world center of science as the result of a conscious government policy decided upon by the first king of the Ptolemaios Dynasty around 300 B.C. and maintained by the successive rulers of Egypt for hundreds of years.

According to a study by S. Dedijer, the goals of at least the first few Ptolemies were to establish Hellenic culture in Egypt to surpass Athens itself as its center.[3] With these policy objectives, the Ptolemies proceeded in a conscious and planned way to use the resources of their state to make Alexandria, newly built on the site of an Egyptian fishing village, into the center of science, philosophy, scholarship, and art of the known world. They exerted their powerful influence to transfer from Athens to Alexandria everything which could promote their basic objective: books, instruments, organizational and institutional patterns, and above all manpower.

Dedijer also points out in his study the migration of scholars and attempts of state power to influence it during the Middle Ages. He thus concludes, among others, that (1) migration of scientists is as old as science and (2) the power holders who had a high degree of appreciation of the social value of science of their time often acted to stimulate or prevent such migrations.

Although brain drain is an old phenomenon in human history, it has aroused intense public concern and discussion only in recent decades. A number of reasons account for that. First of all, the dramatic increases in foreign study since World War II, the explosion of international communications, and the decline in the cost of travel have combined to internalize the market for educated manpower to a degree previously unknown.[4]

Secondly, in addition to Britain's well-publicized anxiety over an increasing loss of her highly educated manpower to the United States, there is a significant concern in the developed part of the world with what happens in the underdeveloped part. And this concern has increased with the growing awareness that development cannot be appropriately stimulated by the mere flow of dollars to the underdeveloped countries, that a no less vital role must be fulfilled by local people with the skills and "know-how" to carry out development programs. Thirdly, on this as well as on other questions, the voice of the underdeveloped countries is heard: they are not willing to overlook in silence developments which they consider detrimental to their interests.

Directions of Brain Drain

Brain drain occurs not only from developing to developed countries, but also between developed countries and between developing countries. As a matter of fact, it was the emigration of British and European engineers and scientists to the United States that gave rise to the widespread attentions of the British, who coined the term "brain drain." Likewise, Canada is a country of large-scale emigration to the United States. Although largely neglected by the scholars, brain drain between the developing countries seems quite serious.[5]

There may be a casual link in the various types of emigration: brain drain from developed country A to richer developed country B may cause brain drain to A from developing country C.[6] An outstanding example is the United Kingdom as a country of large-scale emigration to the United States and the richer Commonwealth countries, on the one hand, and immigration from the Commonwealth, on the other. British National Health Service has been greatly helped by Indian and Pakistani physicians: 44 percent of its junior medical staff come from overseas, mainly from India and Pakistan.[7]

Under certain circumstances, highly trained people do emigrate from developed to developing country. This may come about as a developing country hires a large number of such people from the developed countries in a systematic effort at modernization. It can occur as the result of agreements between governments (e.g., one nation dispatches scientists, technicians, and other technical advisors to help another nation's economic and technical development). In attempts to enhance their operations, many multinational corporations assign high-level manpower from developed to developing nations. In these and other cases, the flow of high-level manpower is relatively small in number.

It is often assumed that flow of "brain" has been directed only to the United States, but this is not so. In fact, highly trained personnel from some countries emigrate to Canada and France in greater numbers than to the United States. While France takes pride in her

aid to former colonies, the new state of Togo has sent more physicians and professors to France than France has sent to Togo.[8]

The immigration of high-level manpower into Canada, especially from Hong Kong and Taiwan, has been increasing in the past decade. Great Britain, alarmed by the exodus of its talent to the United States, is relying heavily on foreign doctors and scientists; as stated before, the operation of its National Health Service depends mainly on Indian and Pakistani medical personnel. There are more specialists of all kinds from other Commonwealth countries working in Britain than there are British specialists working elsewhere in the Commonwealth.

Brain Drain: Who Gains? Who Loses?

One generally assumes that the migrant himself decides to emigrate because on balance he benefits from the emigration. Likewise, it would be reasonable to assume that the receiving country has gained much from admitting him. Thus, former U.S. Senator Walter Mondale criticized the brain drain from the underdeveloped countries in an article entitled "How Poor Nations Give to the Rich."[9] He was seriously concerned with the adverse effects of the brain drain and with the measures to cope with the problem.

On the other hand, there are scholars who see migration as beneficial to both the receiving and sending countries and thus call for a policy of laissez-faire, namely, non-interference with mobility

and migration. By the logic of what is termed the "internationalist" model, Harry Johnson and others argue that the brain drain simply reflects the operation of an international market for specialized human capital and that such capital will tend to move to those regions where its productivity is high and where its contribution is greatest.[10] In other words, when human resources are allocated on a worldwide basis, they will be allocated on the basis of optimal efficiency. According to this argument, when the talented emigrants make valuable contributions in basic research, invent new production processes, or develop new production with the help of expensive research facilities and economic incentives lacking in their home countries, these advances will benefit people of all nations, including the emigrant's country of origin.[11]

The "nationalist" model, on the other hand, regards human capital, on certain minimum levels of human capital, as indispensable to a country's economic development. Its advocates, in contrast with the "international" model, consider the brain drain in most LDCs (less developed countries) as a serious impediment to development and explicitly reject the free flow of skilled and scientific manpower resources between nations; hence, they urge measures to lessen the brain drain and to mitigate its adverse effects.[12]

Inasmuch as unrestricted movement of brain power tends to favor the most advanced and affluent nations, the "nationalist" approach, analogous to the protection of infant industries against premature

international competition, seems quite necessary to assure the LDCs against the loss of specialized manpower needed for their modernization. One advocate of this approach even suggested an emigrating scientist to pay back "the cost of his education with interest to the country of his origin which is thereby compensated for his loss."[13]

In addition to the internationalist/nationalist debate, many other issues have also been discussed in the literature. One such issue is relevance of foreign study: whether foreign study abroad programs are meeting the national development objectives of the home governments.[14] Some writers have examined such negative effects of study abroad as critical foreign exchange losses and the weakening of domestic education.[15]

Radical theorists of development who attribute the underdevelopment of the Third World to international exploitation are concerned with the reinforcement of Western economic and technological imperialism and the perpetuation of the Third World dependence. For instance, Peter Evans analyzes the close alliance between Brazil's ruling elite and the multinational corporations (MNCs) and asserts that, through study abroad, up and coming Brazilians are coopted and incorporated into the global system of MNCs.[16] Through such employment, the loyalties of individuals may shift to the transnational institution, and they may develop a strong vested interest in preserving existing socioeconomic structure which provides them with significant personal financial benefits. Some scholars like Arnove go

so far as to argue that study abroad programs for key elites are part of the subtle system of political control, domination, and dependence.[17]

Causes of the Brain Drain: Factors of Push and Pull

Why do people with a high educational attainment migrate? In an article entitled "Brain Drain or Overflow?" George Baldwin presents a highly thought-provoking answer--the lack of job opportunities for university graduates.[18] He claims that the brain drain in Taiwan, South Korea, the Philippines, and other less developed countries (LDCs) has been caused by "a growth in university graduates greater than their economy can absorb." Baldwin argues that professional migration from developing nations is not a drain, but an overflow--"the LDCs are not being stripped of manpower they badly need; more often than not they are being relieved of manpower they cannot use."[19]

On the other hand, other authors have tried to analyze the factors of "push" and "pull" which make for the brain drain.[20] The push factors are those aspects in the country of origin--for a given profession--which produce emigration, and the pull factors are those in the country of destination--for the same profession--that induce the immigration. From a motivational point of view, the decision to migrate is affected by comparative considerations. A tentative list of the push-and-pull factors include the following:[21]

(1) Salary differentials, both between countries and within the sending and receiving countries.

(2) Logistical support differential--the difference between the support which a person receives from his country of origin to allow him to work effectively in his profession and that which he is offered by the country of destination of the migration.

(3) Professional opportunity. To what extent does highly trained manpower emigrate in search of opportunities for innovation, experimentation, and change? To what extent is such manpower pushed out of its native environment because the latter is encrusted with the dead weight of traditionalism, conservatism, and bureaucracy?

(4) Relevance of foreign training. Is the training received, especially by students from underdeveloped countries, simply irrelevant in societies struggling with the problems of scarcity rather than affluence?

(5) Lack of realistic manpower policies. Is there an over-investment in the production of top-level manpower without regard to the absorptive capacity of developing countries? Do certain countries, like the Philippines, for example, produce too many medical doctors in relation to effective (i.e., economic) demand for such talent at home?

(6) Technology gap. Is there a serious gap between the rate of technological progress between countries like the United States and

the advanced industrial nations of Western Europe? Is the existence of such a gap a primary cause for emigration?

It is also possible to examine causes of the brain drain as eigher motivational or permissive. According to Watanabe, the motivational factors are those which give rise to the idea of emigration and make it appear attractive and profitable, while the permissive factors are those which help remove the obstacles in the path of potential migrants.[22] Watanabe has included the following motivational factors:

(1) The inadequate educational capacity of developed countries. For example, the United States produces only 8,000 physicians a year, while 12,000 are needed. The shortage has been met, to some extent, by foreign personnel secured either by aggressive recruitment at home (i.e., among students and other foreigners currently in the United States) and abroad or by facilitating their immigration.

(2) The gap between the standard of living and income per person of the rich countries and those of the poor countries.

(3) The slow rate of development of the countries of origin.

(4) Inadequate coordination between the education provided and the manpower requirements, with respect to both quality and quantity. Graduates will find themselves unemployed or underemployed and will, if possible, seek opportunities abroad.

(5) Research workers lack professional leadership, adequate research equipment and facilities, opportunities for contact with

other professionals in the same scientific field, scientific stimulus (owing to the general neglect of scientific activities), and social prestige.

(6) The monopolization of senior positions by "old-timers" limits the opportunities of young people who have studied abroad and attained a superior level of education and training.

(7) Frequent political unrest hampers the preparation and implementation of development plans and creates uncertainty about the future. The lack of political freedom and security affects highly trained personnel, particularly, for they are more sensitive and vulnerable in this field.

Watanabe has identified the following permissive factors:

(1) The occupational preferences in the immigration laws of developed countries--for example, Great Britain, Canada, and the United States.

(2) Waivers granted by the United States Government of the two-year foreign residence requirement.

(3) The historical ties exist between the receiving country and the country of origin.

(4) Their international mobility; universal demand for their skills and knowledge without regard to their race, religion, color, and so forth; their knowledge of foreign languages; and greater opportunities they have for international contacts, through which they may have a chance to find attractive job openings abroad.

Notes

[1]Walter Adams (ed.), The Brain Drain (New York: The Macmillan Co., 1968), Introduction, p. 1.

[2]Yung Wei, "Socio-psychological Variables and Inter-nation Intellectual Migration: Findings from Interviewing Returnees in the Republic of China," International Studies Association (Comparative Interdisciplinary Studies Section), Working Paper 15, December 1974, p. 3.

[3]Stevan Dedijer, "Early Migration," in Walter Adams, op. cit., pp. 13-14.

[4]George Baldwin, "Brain Drain or Overflow," Foreign Affairs, Vol. 48, No. 2, January 1970, p. 358.

[5]See, for example, Hayder Khogali Mohammed, "A Descriptive Analysis of the Sudanese Teachers' Emmigration to the Arabian Gulf Region," A Thesis in Educational Theory and Policy, The Pennsylvania State University, August 1986.

[6]S. Watanabe, "The Brain Drain from Developing to Developed Countries," International Labor Review, No. 97, April 1969, p. 401.

[7]Ibid., p. 403.

[8]Walter Adams, op. cit., p. 2.

[9]Walter Mondale, "How Poor Nations Give to the Rich," Saturday Review, March 11, 1967, pp. 24-26.

[10]Harry G. Johnson, "An 'International' Model," in Walter Adams, op. cit., pp. 70, 74-75.

[11]Herbert G. Grubel and Anthony D. Scott, "The International Flow of Human Capital," American Economic Review, Vol. LVI, No. 2, May 1966, p. 274.

[12]Don Patinkin, "A 'Nationalist' Model, in Walter Adams, op. cit., pp. 93-94, 106.

[13]Kenneth E. Boulding, "The 'National' Importance of Human Capital," in ibid., p. 115.

[14]P. William, The Overseas Students Question (London: Heinemann, 1981).

[15]See Hans N. Weiler, "The Political Dilemmas of Foreign Study," and Gerald W. Fry, "The Economic and Political Impact of Study Abroad," in Comparative Education Review, Vol. 28, No. 2, May 1984, pp. 171-179 and pp. 208-210.

[16]Peter Evans, Dependent Development (Princeton: Princeton University Press, 1979).

[17]Robert F. Arnove (ed.), Philanthropy and Cultural Imperialism: The Foundations at Home and Abroad (Bloomington: Indiana University Press, 1982).

[18]George Baldwin, loc. cit., pp. 358-372.

[19]Ibid., pp. 359, 364.

[20]See Enrique Oteiza, "A Differential Push-Pull Approach," in Walter Adams, op. cit., pp. 120-134; and Charles Kao, Brain Drain: A Case Study of China (Taipei: Mei Ya Publications, 1971), Chapter 6.

[21]Adams, op. cit., pp. 6-7.

[22]See Watanabe, loc. cit., pp. 420-425, for the analysis.

Chapter II

TAIWAN'S EDUCATIONAL SYSTEM

In Taiwan, education has always been highly valued. Due to the Confucian tradition, the most respected member of society has been the gentleman-scholar. Indeed, the scholar-gentry class has enjoyed higher social status than the soldier and the merchant.

During 1895-1945, Taiwan was occupied and ruled by Japan. For primarily economic considerations, the Japanese colonial administration introduced a system of popular education at the elementary and secondary level. Several normal schools were also established to train teachers for the island's primary schools. In 1932, only one-half of all school-age boys (and one-fifth of the girls) were enrolled in elementary schools. Ten years later, however, over 90 percent of native Taiwanese, and even 75 percent of the aboriginal children, were attending the free, six-year grade schools.[1]

Beyond primary school, education policy was dilatory and discriminatory. In high schools and at the only university--the Imperial University of Taipei, established in 1928--Japanese students greatly outnumbered Taiwanese, who were subject to restrictive quotas. In 1939, for example, only 90 Taiwanese were registered at the university, and they were permitted to study only medicine, agriculture, and other practical sciences. Many Taiwanese did study

at the American- and British-supported Presbyterian Seminary in the city of Tainan, a private college that still exists and has had great influence on the island's intellectual growth.

By 1944, the eve of Japan's defeat and Taiwan's return to the Chinese control, about 70 percent of the six million Taiwanese were reportedly literate.[2] Whatever their motives, the Japanese colonial rulers did a relatively good job on Taiwan. In addition to developing "infrastructures"--roads, railroads, harbors, power plants--the Japanese gave numerous Taiwanese a thorough technical training. In the view of an expert on Taiwan, the Japanese colonial rule did help create a reservoir of skilled manpower that made an important contribution to Taiwan's post-1949 economic growth.[3]

When the government of the Republic of China resettled in Taiwan, it embarked on a program to modernize the educational system left by the Japanese. Several factors contributed to an improved level of education: among them, implementation of the specific provisions of Articles 158 through 167 of the Constitution of the Republic of China. These articles stipulate in part that educational expenditures for the central government should be no less than 15 percent of the national budget; for each province no less than 25 percent of the total provincial budget; for each county or municipality no less than 35 percent of the total county or municipal budget.[4]

Constitutional provisions by themselves were not sufficient, for the Nationalist regime was not able to implement them while it

was still in power on the mainland before 1949. Rather, three other factors, political stability, the improved economy, and land reform-induced urbanization, created the conditions that enabled the government to put the government policy into practice. Thus, from the 1950s onward, the government in Taiwan implemented the following measures: free primary education for all children 6 to 12 years of age, with free textbooks for children from poor families; equal opportunity for all children to receive an education; and grants from the national government to aid poorer areas, especially in the mountains, to develop educational facilities.

Postwar educational progress in Taiwan may be measured by comparing the number of schools and the number of students enrolled at all levels of education. For example, the number of institutions of higher learning increased from 7 in 1950-1951 (1 university, 3 colleges, and 3 junior colleges) with a total of 6,665 students, to 104 in 1981-1982 (16 universities, 11 colleges, and 77 junior colleges) with a total enrollment of 358,437--an increase of about 53-fold in student enrollment. Similar expansion is to be found in the number of schools and students at the secondary school level. In 1950-1951, there were 128 secondary schools (junior and senior) having a total of 79,948 students. In 1981-1982, there were 838 secondary schools (junior and senior) with 1,253,333 students, an increase of 1,467.7 percent in student enrollment. At the elementary level, there were 1,231 schools enrolling 906,950 students in

1950-1951, but by 1981-1982, there were 2,444 schools with 2,213,179 students--an increase of 144.0 percent.[5] In 1979, 99.68 percent of school-age children attended schools (see Table II-1), second only to Japan.

Education in the Republic of China or Taiwan stresses national morality, cultural traditions, scientific knowledge, and the ability to work and contribute to the community. The Constitution stipulates that all citizens shall have equal opportunity to receive education, and that fixed proportions of the budgets at different levels of government must be spent on education.

Education in Taiwan is administered at three levels: national, provincial, and county. At the national level, the Ministry of Education is in charge of policymaking and educational development. At the provincial level, the provincial government has a department of education. The municipal and county governments include bureaus or sections devoted to education. These agencies are also responsible for social education and the administration of libraries, museums, and stadiums. The description below is based on a number of reference books, yearbooks, and other source materials published in Taiwan.

(1) School System: The school system of Taiwan is divided into three levels: nine-year free education, senior secondary education, and higher education.

Nine-year education includes six years of elementary education beginning at the age of six and three years of junior middle school

Table II-1. Educational Growth in Taiwan, 1950-1979.

Comparison of Number of Students and Population				Percentage of School-Age Children Attending Schools and Percentage of Graduates Pursuing Advanced Study				
						Graduates Admitted to Next Level of Education (%)		
School Year	Population (1,000)	Number of Students (1,000)	Student-Population Ratio (1,000)	School Year	School-Age Children Attending Schools (%)	Elementary School	Jr. High School	Sr. High School
1950	7,554	1,055	139.64	1950	79.98	31.99	61.38	72.57
1951	7,869	1,135	144.19	1951	81.49	36.55	59.21	67.93
1952	8,128	1,188	146.14	1952	84.00	33.76	62.89	46.21
1953	8,438	1,276	151.22	1953	87.75	35.56	66.97	70.11
1954	8,749	1,383	158.08	1954	90.83	38.73	72.19	75.17
1955	9,078	1,535	169.15	1955	92.33	43.03	75.82	78.42
1956	9,447	1,679	177.71	1956	93.82	46.69	72.95	76.17
1957	9,748	1,848	189.57	1957	94.61	48.52	74.43	67.03
1958	10,092	2,037	201.85	1958	94.84	50.30	74.34	66.22
1959	10,485	2,213	211.03	1959	95.44	50.71	78.36	65.94
1960	10,851	2,375	218.91	1960	95.59	51.24	79.56	76.37
1961	11,210	2,541	226.64	1961	96.00	52.51	81.85	76.75
1962	11,575	2,703	233.50	1962	96.52	54.36	80.04	72.74
1963	11,949	2,824	236.30	1963	96.71	53.49	77.34	78.14
1964	12,325	2,964	240.51	1964	96.83	55.14	79.31	77.51
1965	12,699	3,117	249.49	1965	97.15	57.40	85.36	67.78
1966	13,065	3,253	249.03	1966	97.16	58.95	79.77	68.11
1967	13,371	3,406	254.75	1967	97.52	62.29	79.13	71.77
1968	13,726	3,615	263.35	1968	97.67	74.66	89.36	71.19
1969	14,412	3,810	264.35	1969	97.62	76.01	86.72	72.46
1970	14,754	3,992	270.54	1970	98.01	79.81	90.13	71.93

Table II-1 (Continued).

Comparison of Number of Students and Population				Percentage of School-Age Children Attending Schools and Percentage of Graduates Pursuing Advanced Study				
						Graduates Admitted to Next Level of Education (%)		
School Year	Population (1,000)	Number of Students (1,000)	Student-Population Ratio (1,000)	School Year	School-Age Children Attending Schools (%)	Elementary School	Jr. High School	Sr. High School
1971	15,073	4,131	274.04	1971	98.02	81.39	71.35	75.17
1972	15,367	4,269	277.81	1972	98.13	83.86	70.55	83.43
1973	15,642	4,334	277.90	1973	98.09	84.26	65.43	74.84
1974	15,927	4,395	275.94	1974	98.46	88.62	64.61	73.41
1975	16,223	4,449	274.24	1975	99.29	90.06	67.06	78.76
1976	16,580	4,479	270.15	1976	99.42	91.01	60.02	77.05
1977	16,882	4,522	267.86	1977	99.57	94.21	60.00	77.20
1978	17,202	4,530	263.31	1978	99.64	94.70	60.15	74.27
1979	17,543	4,576	260.51	1979	99.68	96.20	62.44	79.57

Source: Contemporary Republic of China: The Taiwan Experience, 1950-1980, pp. 78-79.

education. An elementary school and all junior middle schools can be found in every administration district. Secondary education encompasses senior high schools and vocational schools.

Higher education comprises junior colleges, universities, and research institutes. Except for medical and some architectural departments requiring five or seven years of study, courses at universities and colleges are of four years duration. In colleges, medical studies take four years of classroom study and three years of field practice. There are also five-year colleges. Normal and medical students are required to put in a year of internship before graduation. Master and doctoral courses of study last two years or longer.

(2) Nine-Year National Free Education: According to the Chinese Constitution, all children from six to twelve years of age must receive free elementary education. Children from poor families are supplied with textbooks at the government's expense. During this period, emphasis is placed on the physical and moral development of the child and the inculcation of ethical principles and correct behavior. This humanist emphasis has always been a cornerstone of Chinese education.

In the 1950-1951 school year there were only 1,231 elementary schools with 906,950 pupils. Owing to the growing population, both the number of elementary schools and their pupils continued to increase in the following decades.

To raise the general education level of the people, in the 1968-1969 school year, the three years of junior high school which had in the past been regarded as a part of secondary education were reassigned to the elementary segment of the educational system and became free education. To mark this important change, the term "National High School" (Public Junior High School) is now used in lieu of the traditional term "Junior High School." There were in the 1968-1969 school year 2,244 schools with 617,225 students. Twelve years later, in the 1981-1982 school year, the number of elementary schools had increased to 2,444 though the number of pupils was down to 2,213,179. The number of public junior high schools had increased to 658 and their enrollment to 1,070,942.

(3) Secondary Education: Secondary education in Taiwan used to encompass three kinds of schools: general high schools, normal schools, and vocational schools. With the reassignment of the traditional three-year junior high school to the final stage of elementary education, the senior high schools have been continuing to lay emphasis on developing the student's personality and conceptual skills while further strengthening the basic citizenship education. After the implementation of nine-year national education, no junior vocational students were admitted. In an effort to upgrade the quality of elementary school teachers, the normal schools have been gradually transformed into junior normal colleges, beginning from the 1960-1961 school year. Consequently, the original number of schools

and their students decreased in the following years until all were reorganized into junior normal colleges by the 1971-1972 school year.

(4) Senior High Schools: The three-year senior high school education has as its objective the cultivation of the student's interest and ability to learn in order to prepare him for advanced study in later years. There were in the 1950-1951 school year 62 high schools, with a total of 18,886 senior high school students. In the 1981-1982 school year, the number of senior high schools had increased to 180, while their students numbered 182,391.

(5) Vocational Schools: The purpose of vocational education is to provide youths with productive knowledge and skills so that they can, after graduation, engage in productive work. In the 1950-1951 school year, there were altogether 77 vocational schools with 34,437 students, of whom 23,211 were in junior vocational schools and 11,226 in senior ones. Of the total number of students in vocational schools, agricultural schools accounted for 35.4 percent, industrial schools for 25.7 percent, commercial schools for 32 percent, and others for 6.9 percent.

In the 1980-1981 school year, the number of vocational schools had increased to 196, representing a rise of 154 percent over the 1950-1951 figure. (In addition, there were 88 vocational courses affiliated with high schools.) The number of students in the vocational schools had risen to 374,206. All of these were senior

vocational students, thus marking an increase of 987 percent. Of this total, agricultural students accounted for 4.48 percent, industrial students 48.51 percent, commercial students 39.04 percent, and others, including marine, medicine, and home economics, were 7.9 percent. The establishment of the various kinds of vocational schools is well coordinated with the need of national reconstruction.

(6) Higher Education: Higher education comprises junior colleges, colleges, universities, and research institutes. Junior colleges are aimed at the teaching of applied sciences and training of technicians. Colleges, universities, and research institutes provide opportunities for advanced studies and training specialists in their chosen fields.

The Ministry of Education has made special funds available to encourage colleges and universities to set up graduate schools. A master's degree is awarded by graduate schools upon qualification. The doctoral degree can be conferred only by the Ministry of Education after a candidate has written a dissertation and successfully defended it in front of a committee appointed by the Ministry.

In the 1950-1951 school year, there were altogether seven institutions of higher learning--a university, three colleges, and three junior colleges--plus three research institutes. There was a total of 6,665 students. In the following years of economic development and rising demand for specialized personnel, institutions of higher learning continued to increase. Consequently, the number of

institutions of higher learning in the 1984-1985 school year rose to a record high of 105, including 16 universities, 12 colleges, and 77 junior colleges, with a total of 276 affiliated research institutes. The number of students rose to 412,381, an increase of almost 62-fold in the 35-year period.[6]

Education and Migration

Ironically, Taiwan's enormous expansion in higher education noted above and the great value that people attach to education have helped push Taiwan's college graduates to go abroad for graduate work. Despite the fact that some local universities began to establish graduate programs in the late 1950s, offering both master's and, to a lesser extent, doctorate degrees, these programs have remained quite small and can only enroll a small portion of the applicants. Moreover, due to lack of a sufficient number of qualified faculty members, for a long time these graduate programs were not generally considered to be of high quality; consequently, those who aspire to advanced study prefer to go abroad, especially to the United States. We will examine in some detail this elite migration in the following chapter.

Notes

[1]Douglas Mendel, The Politics of Formosan Nationalism (Berkeley: University of California Press, 1970), p. 21.

[2]Ibid.

[3]Parris H. Chang, "Taiwan: Beautiful Island," The Wilson Quarterly, Vol. 3, No. 4, Autumn 1979, p. 65.

[4]See Republic of China: A Reference Book (Taipei: Government Information Office, 1983), pp. 432-433.

[5]Ibid., p. 221.

[6]Republic of China: A Reference Book (1986), p. 271.

Chapter III

THE MIGRATION OF INTELLECTUALS

More than 90,000 college and university graduates have left Taiwan for study abroad since the 1950s; approximately 80 percent of them have come to the United States. To regulate and screen students' advanced foreign studies, the ROC Ministry of Education established a system of "examination for studying abroad" in 1954 and a screening system since 1976. Passing the qualifying examination was a necessary step for the students to obtain passports and buy foreign exchange from the Bank of Taiwan. In 1954, 399 college graduates went abroad to pursue advanced studies, and the number increased steadily and rapidly over time.[1]

According to the information provided by ROC National Youth Commission, between 1960 and 1969, a total of 118,520 college graduates were produced in Taiwan, and 21,248 or 17.93 percent of them went abroad for further studies.[2] In the following decade, between 1971 and 1979, the number of students going abroad was 31,365, or 5.9 percent of the 529,884 college graduates.[3]

In the decade of 1960-1969, out of 21,248 students studying abroad, 3,412 or 16 percent of them majored in natural science; 5,561 (26 percent) majored in engineering; 743 (3.5 percent) were doctors or medical students; and 2,502 (11.7 percent) studied

agriculture. These four categories of students totaled 12,218, or 57 percent of all who went to the United States to study (see Table III-1).

During 1970-1979, among the 31,365 students who went abroad, engineering students remained the largest group, 7,590 or 24 percent of the total; 6,521 (20.8 percent) studied natural science; 1,431 (4.5 percent) were doctors or medical students; and 2,420 (7.7 percent) majored in agriculture. These four groups added up to 17,962, or 57 percent of the total.

In contrast with most other countries, the overwhelming majority of students from Taiwan are in graduate school, since normally only students who have already completed their undergraduate education in Taiwan are allowed to study overseas. Thus, those college graduates who left Taiwan for study abroad are among the best and the brightest of the society.

Among those who have studied abroad, 80 percent have gone to the United States. Prior to 1945, Taiwan was Japan's colony, and many young people went to Japan to study. After the war, the United States was the most advanced and powerful nation in the world and was admired by the people in Taiwan. Since 1945, Taiwan's secondary school students have been required to study English for six years. Moreover, the United States safeguarded Taiwan's security after 1950 and provided much needed economic and technical aid. These factors were very important in influencing the students' migration to the

Table III-1. ROC Students Studying Abroad and Their Majors.

Unit: Person

Period	Total	Humanities	Education	Fine Arts	Law	Social Sciences and Behavior	Natural Sciences	Engineering	Medical Science	Agriculture	Others
1952-61 Average	558	77	10	11	19	82	47	177	22	60	11
1962	1,833	279	44	38	85	306	229	575	42	225	11
1963	2,125	274	55	56	70	398	265	693	56	250	1
1964	2,514	354	73	52	84	541	315	715	83	291	1
1965	2,339	383	72	54	76	501	315	553	94	281	11
1966	2,189	336	67	48	54	445	372	521	107	234	1
1967	2,472	302	76	37	57	483	429	633	111	336	1
1968	2,711	394	60	81	77	555	577	576	104	287	--
1969	3,444	480	58	138	69	729	741	717	116	397	--
1970	2,056	240	23	50	27	318	515	553	86	244	--
1971	2,558	329	33	74	43	500	625	607	79	268	--
1972	2,149	260	23	79	41	473	532	439	88	214	--
1973	1,966	254	29	60	43	350	502	425	97	206	--
1974	2,285	237	32	37	55	442	596	568	98	220	--
1975	2,301	325	32	79	55	448	537	528	96	201	--
1976	3,641	489	56	89	66	790	802	927	180	242	--
1977	3,852	567	73	112	69	928	732	935	198	238	--
1978	4,756	682	77	169	97	1,228	827	1,218	213	245	--
1979	5,801	869	112	150	127	1,662	853	1,390	296	342	--
1980	5,933	903	115	156	112	1,761	846	1,421	279	340	--
1981	5,363	807	123	166	88	1,498	720	1,439	255	267	--
1982	5,925	768	97	103	105	1,510	856	2,058	205	223	--

Source: National Youth Commission (NYC).

United States. The Consulate Section of the American Embassy in Taipei issued 13,900 regular student visas (F-1) and 3,391 exchange visas (J-1) in the calendar years of 1960-1968 (see Table III-2).

In 1961, the Institute of International Education (IIE) data show the total number of Taiwan's students in the United States reached 5,673, second only to the Canadian students in the U.S. colleges in the same year. By at least the late 1970s, students from Taiwan became the largest group of foreign students in the U.S. university campuses and have remained so ever since. Thus, according to the IIE, during the 1986-1987 academic year the largest group of foreign students studying in the U.S. colleges and universities is from Taiwan, totaling 25,660.

It should be pointed out, however, that in addition to the outflow of college graduates, two other groups also leave Taiwan continuously. One is composed of overseas Chinese students who came to Taiwan only for a college education. During 1952-1969, of these 12,761 overseas Chinese who were graduated in Taiwan, 85.5 percent left Taiwan.[4] Such an outflow is not considered a part of Taiwan's brain drain since they came to Taiwan with the understanding that they would return to their overseas residences. The other group is made up of those who have obtained an employment contract from other countries. The data released by the Overseas Chinese Affairs Commission indicate that 770 left Taiwan for the United States under such an arrangement in 1962-1967. No information is available about

Table III-2. Chinese Students' Visa Performance Record from American Embassy, Taipei, Taiwan, 1960-1968.

Year	F-1 Visas	Rate of Annual Change (%)	J-1 Visas	Rate of Annual Change (%)	Total
1960	622	--	277	--	899
1961	760	22	344	24	1,104
1962	1,059	39	324	- 6	1,383
1963	1,557	40	339	5	1,896
1964	1,939	25	346	2	2,285
1965	1,742	-10	327	- 6	2,069
1966	1,621	- 7	392	20	2,013
1967	2,174	34	493	26	2,667
1968	2,426	12	549	11	2,975
Total	13,900	--	3,391	--	17,291
Average	1,544	--	377	--	1,921

Source: Data were provided by the Consulate Section, American Embassy, Taipei, Taiwan, July 1969. From Charles H. C. Kao, Brain Drain: A Case Study of China, p. 22.

the education or occupation of these people, nor about the flow prior to this period. They could be nurses, cooks, language teachers, medical doctors, or skilled workers. However, this number compared to college graduates is rather insignificant.

Approximately 80 percent of college students from Taiwan who came to the United States since the 1950s have not returned. Before we analyze their reasons for staying in the United States, let us first examine their initial migration decision. Students usually go (or are sent) abroad for an initial period that is quite clearly specified. They are expected to return home to work following their period of study.

Thus, they are a special and different type of high-level international migrant, as Myers points out.[5] They are usually younger and less experienced in an occupational role than other high-level migrants. Their decision to migrate for foreign study is probably less related to ultimate occupational objectives than the decision of an older, more mature professional person.

As one of those who left Taiwan in the 1960s to come to the United States for graduate work, I can view such international migration from intimate personal experience. College students from Taiwan tend to view graduate study in the United States as an inevitable extension of university education. We believe an advanced degree and improved education would enable us to make a greater

contribution to our society, to obtain a more promising career, and to lead a better life.

Before such a life goal can be reached, we had to overcome several serious obstacles. First, we had to pass the rigorous qualifying examination administered by the Republic of China Ministry of Education. Second, we must do well in the TOEFL at the U.S. Embassy. Third, we must have an American university admission and convince the U.S. Consul officer of our financial means before he would issue the visa. In the 1950s and 1960s, few families in Taiwan really had the means to provide for study abroad; many of us managed to secure scholarships or assistantships from American universities, but those who did not were able to make it either through work-study or other means. To do all of these required considerable ability and determination, and most of us made it on our own initiative. It is also true that not a few went abroad because of family or peer pressure.

Although highly impressionistic, I remember social pressure as a very important factor pushing the college graduates to study abroad. Inasmuch as an advanced degree from an American university carried immense prestige and great practical value, it became a symbol of status. To prove one was somebody, or simply to "keep up with the Joneses," one had to go to the United States and receive a graduate degree, preferably a Ph.D.

To augment and supplement such personal observation, let me cite a more systematic investigation conducted by Charles H. C. Kao. Based on his research findings, he lists the following as the key factors which account for the initial outflow of Taiwan's university graduates: pursuit of knowledge, lack of promotion, search for new opportunity, availability of financial assistance in American universities, social and family pressure, lack of research facilities, intellectual atmosphere, and inadequate pay at home.[6]

In a 1968 survey of 109 highly educated Chinese who studied in the United States and returned to Taiwan, Yung Wei found their answers to the question, "What has been the reason for you to study in the U.S.?" as follows:[7]

To gain knowledge and increase ability	67.9%
To be more qualified for the job desired	5.5%
To speed promotion in one's career	21.1%
To increase my income	0.0%
To bring prestige to my family	2.8%
Other reasons	2.7%
	100.0%

Further examination by contingency analysis shows that expectations of the parents, girl (boy) friends, friends, and coworkers, all had extensive impact on a person's decision to study abroad. For instance, 46 percent of the returnees indicated that the expectation of the parents was an important reason for their going to the United

States. Fifty percent considered the expectation of their girl (boy) friends an important influence on their decision. Forty-five percent of the respondents believed that, by going abroad, they would have bettered their chances of finding an ideal spouse. Moreover, 36 percent of the respondents believed that if they had failed to study abroad, their friends and coworkers would have looked down upon them.

After correlating self-identified reasons for going abroad with the expectations of parents, girl (boy) friends, and friends, it was revealed that even among the respondents who chose "pursuit of knowledge" as the major reason for studying in the United States, a sizable percentage considered the expectations of the above-mentioned individuals had a great impact on their decisions.[8] Thus, it is evident that, in addition to academic and career considerations, attitudes of parents, girl (boy) friends, friends, and coworkers all have had important effects on the person's decision to study abroad.

In addition, we should also note the findings from a more recent empirical study conducted by the Republic of China authorities. In a survey in 1979 of 1,530 college students who were attending a Ministry of Education seminar for those going abroad, in which 594 returned the questionnaire, 284 cited "to receive advanced degrees" as the most important reason behind their decision to study abroad, while 155 gave "better research facilities in foreign institutions" as the most important cause.[9] Family or social pressure also emerged

as a very important factor, as 45 students named it as the key reason behind their decision. The distribution of their answers to "What is the main reason for you to study abroad" is as follows:[10]

To receive advanced degrees	284 persons
Better research facilities abroad	155 persons
No suitable job at home	36 persons
More promising career prospects abroad	30 persons
Required for work at home	24 persons
Wishes of the family	26 persons
Wishes of the girl (boy) friends	6 persons
Exhortation by friends/teachers	13 persons
Others	17 persons
Total	591 persons

From these responses, it is quite obvious that the elite emigration in Taiwan has been caused by a host of complex, academic, social, economic, and personal factors. The notion that brain drain is motivated only or even primarily by economic considerations is not supported by empirical data; but we do not know how many actually came to the United States anticipating a higher standard of living, because they may not want to disclose their real motives.

Notes

[1]Kun-fei Huang, A Survey-Analysis of the Employment of the Returned Scholars and Students (Taipei: National Youth Commission, Executive Yuan, 1979), p. 18.

[2]Shun Yao, A Study on the Chinese Students Abroad, 1960-1979 (Taipei: National Youth Commission, Executive Yuan, 1981), p. 33.

[3]Ibid.

[4]Central Daily News (Taipei), May 22, 1970; cited in Charles H. C. Kao, Brain Drain: A Case Study of China, p. 23.

[5]Robert G. Myers, Education and Emigration (New York: David McKay Co., 1972), pp. 18-19.

[6]Kao, op. cit., p. 123.

[7]Yung Wei, "Socio-psychological Variables and Inter-nation Intellectual Migration: Findings from Interviewing Returnees in the Republic of China," loc. cit., p. 24.

[8]Ibid.

[9]Shun Yao, op. cit., p. 60.

[10]Ibid., p. 61.

Chapter IV

AN ANALYSIS OF TAIWAN'S BRAIN DRAIN INTO THE UNITED STATES

Students studying abroad must face a second decision--to return to Taiwan following study or to remain abroad. If a student returns, he or she represents a gain to Taiwan; otherwise, he or she becomes a part of the brain drain statistics. This chapter will analyze why students chose to stay abroad (primarily the United States) following their study by examining specific factors influencing their decision.

All the available information has shown that a high percentage of students from Taiwan studying abroad have not returned upon the completion of their study. In the 1960s, whereas 21,248 students left Taiwan for advanced study, only 1,172 returned to Taiwan, a mere 5 percent retention rate (see Table IV-1), which means that each year, on the average, no more than 120 persons returned to Taiwan. In the decades of 1970-1979, there were 33,165 students who went abroad to study, and 5,028 or 15 percent returned, a marked improvement over the 1960s. Overall, the non-returns in the two decades amounted to approximately 88 percent of the student migrants, and the overwhelming majority of the non-returns have stayed in the United States.

As a government manpower study shows, during 1976-1981, one out of every five college graduates in the fields of science and

Table IV-1. The Employment of Taiwan's Students Returned from Abroad.

Period	Total	Employed by Government Agencies	Employed in Industry and Commerce	Teaching in Universities and Colleges	Teaching in Secondary Schools	Working in Hospitals	Working in News Agencies	Others
1952-61 Average	48	12	9	10	--	4	2	11
1962	63	13	17	11	1	1	3	17
1963	95	18	13	25	1	2	5	31
1964	96	16	17	25	--	--	5	33
1965	120	25	13	42	1	2	5	32
1966	136	29	21	35	2	3	2	44
1967	153	40	8	29	1	--	--	75
1968	184	38	20	48	2	3	1	72
1969	226	65	49	88	1	3	1	19
1970	407	69	70	215	6	2	1	44
1971	320	42	67	99	20	8	10	74
1972	355	78	69	130	3	5	4	66
1973	445	53	99	172	22	2	2	95
1974	486	64	124	199	9	3	8	79
1975	569	82	127	258	3	12	6	81
1976	722	81	123	298	5	15	20	180
1977	624	42	132	289	--	23	17	121
1978	580	48	102	218	1	16	16	179
1979	478	104	99	177	8	11	5	74
1980	640	71	72	162	--	10	--	325
1981	937	132	123	229	--	24	5	424
1982	1,106	109	408	266	4	26	12	281
1983	1,257	161	100	361	--	25	9	601
1984	1,329	124	136	441	6	39	12	571
1985	1,350	164	357	448	5	48	13	315

Source: National Youth Commission (NYC).

technology went abroad, and only 10 percent of these students returned.[1] Moreover, after 1978, the percentage of college graduates going abroad increased markedly, while the rate of returnees declined initially as the United States severed diplomatic ties with the ROC government in 1979 but picked up steadily after the political shock subsided. A large number of those who left Taiwan were graduates from the fields of engineering and science; in fact, more than 40 percent of the graduates of the departments of mechanical engineering, electric engineering, civil engineering, physics, and chemistry from such prestigious universities as National Taiwan University and Tsinghua University went abroad, and almost 95 percent of them went to the United States, while the American-returned students were less than 10 percent on the average.

According to the figures released by the United Nations, during June 1962 to June 1967, 51,218 individuals migrated into the United States from Taiwan;[2] of these, 7,343 were professionals, technical, and kindred workers; 1,406 were engineers; 610 were natural scientists; 99 were doctors; and 112 were specialized nurses. Among them, a substantial portion were students who, due to the changes in the 1965 U.S. Immigration Act, were able to change their status and became "immigrants." Prior to the 1965 Immigration Act, apart from special exceptions from time to time, immigration from the non-Western Hemisphere countries conformed strictly to national origin quotas. Taiwan, for example, had been limited to 100 immigrant visas per

year, as had most other Asian countries. As a result of the new immigration regulation, "people having special education and skill qualifications" were allowed to enter the United States "without regard to national quotas."[3] Thus, the scientist immigrants from Taiwan increased from 47 in 1965 to 1,321 in 1967.

The precise figures of Taiwan's students remaining in the United States upon the completion of their study are not available. It is known, however, that from 1971 to 1986, a total of 9,822 students did return to Taiwan from the United States; this figure represents about 15 percent of those who have come to the United States. All in all, the number of the non-returnees in the past three decades may have exceeded 60,000 persons.

Who are these highly educated migrants? What are their social and professional characteristics? What factors influence their decision to stay in the United States? Valuable information about them is gleaned from a study done under the auspices of the Republic of China National Youth Commission (NYC).

During 1960-1979, more than 52,613 college graduates were permitted to study abroad; of them, 64 percent were male; 25 percent of the students majored in engineering, the largest group. Next came those who studied the social sciences and the natural sciences. Out of the 31,365 college graduates who went abroad during 1970-1979, 7,360 or 23.47 percent were from the National Taiwan University, the best in Taiwan;[4] 88.64 percent went to the United States, while Japan

was a distant second, the choice of only 3.68 percent of the student-migrants.

Based on a sample of 824 Taiwan's "scholars" and students overseas, their median age in 1979 was 38.5 years old; 90 percent of them were married; 82.89 percent of their spouses were Chinese and 10.07 percent were American. Females constituted only 12.74 percent of this elite group, with a younger median age of 30.3 years old and 78.10 percent married. The data also show that 64.26 percent of the respondents' fathers had a college education or better, and that 56.48 percent of the respondents' family members had also studied abroad.[5]

Likewise, it is obvious from the survey that most of the parents were government employers/teachers, businessmen, and professional people (Table IV-2), and the sample scholars/students residing in the United States were brought up in well-educated and well-to-do families.[6] As a matter of fact, among the 727 respondents who answered the question on the financial situation of their parents, 613 persons or 84.32 percent were from comparatively well-off families; 34 or 4.68 percent were from affluent or wealthy families; and only 80 or 11 percent were from poor families.[7]

Prior to their graduate studies in the United States, approximately 94 percent of the respondents already had bachelor's degrees. As explained previously, due to lack of competent personnel, the quality of most graduate schools in Taiwan was not outstanding, and

Table IV-2. Family Background of a Sample of Taiwanese Scholars in the United States, 1980.

Father's Occupation	Number	Percent
Civil service employee, teacher, and military personnel	369	50.14
Businessman	123	16.71
Professional (doctor, lawyer, and accountant, etc.)	96	13.04
Worker	33	4.48
Farmer	40	5.44
Self-employed	75	10.19
Total	736	100.00

Source: Shun Yao, A Study on the Chinese Students Abroad, 1960-1979, p. 57.

graduate training in many fields was not available. Moreover, the Republic of China government does not permit a student to study abroad unless he has a college or junior college degree and can also meet other requirements.

Once they came to the United States, 39.42 percent of them studied engineering, and 23.61 percent studied science. The distribution of other fields was business, 8.9 percent; humanities, 8.41 percent; agriculture, 7.17 percent; medicine, 5.07 percent; law and politics, 4.33 percent; and education, 3.09 percent. A very high percentage of the respondents studied the same subjects in graduate schools as they did as undergraduates; for example, more than 92 percent of those in engineering, 82 percent in science, 93 percent in business, 90 percent in medicine, 78 percent in law and politics, and 100 percent in education pursued the same majors as undergraduates. On the other hand, 45 percent of those studying agriculture in Taiwan shifted to new fields such as science and engineering.[8]

In terms of the length of their stay, 582 of them lived in the United States more than six years, and 124 stayed between three to five years. Their expressed major purpose was to pursue knowledge and earn the highest possible degree. Thus, out of the 802 respondents, 469 or 58.48 percent had received doctoral degrees, and 304 or 37.91 percent obtained master's degrees (Table IV-3).

How did they finance their studies in the United States? Surprisingly, 595 out of 809 scholars/students were supported by

Table IV-3. Sample Scholars' Academic Degrees.

	Total	Ph.D.	M.A. (M.S.)	B.A. (B.S.)
Number	802	469	304	29
Percent	100.00	58.48	37.91	3.61

Source: Shun Yao, A Study on the Chinese Students Abroad, 1960-1979, p. 70.

universities' scholarships and assistantships and fellowships of some sort. The next important source of financing was the scholars' own efforts: 214 supported themselves by part-time work. Only 90 depended on financial support from family and relatives (Table IV-4). In spite of the fact that the sample scholars/students were generally brought up in well-educated and well-off families, their studies in the United States appear to be related less to their family resources than to their own academic ability and support by U.S. universities.

What kind of job did they take when they completed their degrees? Among the 767 respondents in the United States, 663 were employed; the remaining were 94 students still studying and 10 who had

Table IV-4. Taiwanese Scholars' Financial Sources for Studies in the United States.

	Total	Work-Study	Fellowship/ Assistantship	Family	Others
Number	809[a]	214	595	90	33
Percent	100.00	26.45	73.55	11.12	4.08

[a]The total in this row exceeds the number of respondents because some checked more than one financial source.

Source: Shun Yao, A Study on the Chinese Students Abroad, 1960-1979, p. 71.

graduated but were not employed. Among those 663 who had jobs, 274 or 41.33 percent worked in industries; 146 or 22 percent were college professors and an additional 96 or 14 percent worked in academic research organizations; 74 or 11 percent served in federal and state government agencies; and 31 or 4.6 percent were in business (Table IV-5). In contrast with a 1969 survey, which found 53 percent of the sample scholars were college professors and 34 percent were employed in industries, a large number of the scholar-immigrants of the 1970s chose employment in industry over university. Nonetheless, the fact that more than 36 percent of them would elect to teach in

Table IV-5. Employment Patterns for a Sample of Taiwanese Scholars Who Stayed in the United States.

Employer	Number	Percent
College or university	146	22.02
Institute of academic research	95	14.33
Industry	274	41.33
Government agencies	74	11.16
Business	31	4.68
High school	7	1.05
Others	36	5.43
Total	663	100.00

Source: Shun Yao, A Study on the Chinese Students Abroad, 1960-1979, p. 71.

the university or do academic research is quite remarkable and testifies to the high social value they continue to place on the pursuit of knowledge and teaching in the university.

The "Pull" and "Push" Factors

In order to explain Taiwan's brain drain to the United States, we will follow the widely accepted pull-and-push approach. That is, we will examine both the "pull" factors in the United States for the scholar-immigrants' decision to immigrate and the "push" factors in Taiwan for their decision not to return.

According to the NYC survey cited above, out of the 765 respondents, 344 or 44.97 percent of them "do not plan to return to Taiwan for the time being"; 336 or 43.92 percent are "undecided"; and only 85 or 11.11 percent "have decided to return to Taiwan shortly." This means close to 90 percent of the sample scholars will be either temporarily or permanently lost to Taiwan. What factors have influenced their decision?

The survey data indicate that factors such as age and the duration of stay in the United States are highly important. That is, the older the scholar and the longer he has been in the United States, the more likely he is to have a satisfactory career in the United States and less likely to return to Taiwan.[9]

In addition, the following "pull" factors in the United States are even more important:

(1) Better teaching/research facilities.

(2) Promising career prospect and better professional opportunities.

(3) High salary.

(4) Strong job satisfaction.

(5) Marital and family consideration.

As can be expected, the respondents attach great importance to better teaching and research facilities in the United States; to highly trained scholars teaching/research facilities are a very strong consideration in influencing them to stay.

Another important "pull" factor is the belief that the United States provides greater opportunities for creativity and career advancement. This is a country where professional achievement is recognized and rewarded, and scholars/scientists also value highly mutual intellectual stimulation and team work.

High salary is still another critical "pull" factor. Doctoral and master's degree-holders in the United States earn approximately three to six times more than the same degree-holder in Taiwan. In 1979, 654 or close to 7 percent of the 654 surveyed scholars were receiving an annual salary of $21,601 (after taxes).[10]

Moreover, the scholars in the sample appear to be generally satisfied with their jobs. In addition to their salary, most seem to be either very satisfied or modestly satisfied with their work conditions and recognition, and more than 80 percent of them reported

a sense of achievement (Table IV-6). Questions arise as to how we view such survey data. It is possible, for example, to place emphasis on those respondents who are dissatisfied and those who are only modestly (mildly) satisfied, and to arrive at a somewhat different interpretation of the survey results. Be as it may, we must also stress that job satisfaction is only one of the many factors weighed in the scholars' decision whether to stay or return to Taiwan.

The fifth strong "pull" factor is family. There is a very high correlation (90 percent) between those who are married and the non-returning scholars.[11] Many Taiwanese housewives in the United States appear to enjoy the "American way of life"--big house, good income, modern household appliances, few social obligations, and more freedom--and some have also their own careers. Moreover, the concern for the education of their offspring, who cannot read and write Chinese well enough, becomes an added disincentive to go back to Taiwan.

With regard to the "push" factors in Taiwan, they already have been examined in some detail in Chapter III and need not be repeated. What ought to be pointed out here is an important omission in the 1979 NYC survey which is, I believe, a strong "push" factor that has an important bearing in many scholars deciding not to return to Taiwan. I am referring to a lack of political freedom and the authoritarian rule of the Kuomintang (Nationalist) regime in Taiwan

Table IV-6. Taiwanese Scholars' Job Satisfaction in the United States.

	Overall	Environment	Time	Salary	Promotion	Recognition	Sense of Achievement
Highly satisfied	40.11%	53.68%	67.68%	30.59%	29.66%	37.71%	30.28%
Mildly satisfied	49.21%	43.72%	30.88%	60.17%	48.17%	53.02%	50.53%
Dissatisfied	10.68%	2.60%	1.44%	9.24%	22.17%	9.27%	19.19%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Source: Shun Yao, A Study on the Chinese Students Abroad, 1960-1979, p. 73.

which has had a highly adverse effect on Taiwan's academic freedom and intellectual atmosphere.

Speaking from my personal knowledge, I know that most scholars of Taiwanese origin are very critical of the KMT regime, and many have been blacklisted by the regime. When Professor Wen-Cheng Chen of Carnegie-Mellon University went to Taiwan to visit his parents in 1981, he died under mysterious circumstances, and many observers held the authorities responsible. Until Taiwan is truly democratic and governed by a genuinely representative government, many Taiwanese scholars in the United States will be reluctant to return.

Moreover, many mainland China scholars who came to the United States from Taiwan in the 1960s and 1970s are highly ambivalent toward Taiwan. Many of them do not identify with Taiwan, which is not their native place but a way station to somewhere else. Furthermore, ever since the early 1970s when President Nixon visited China, the future and security of Taiwan has been clouded; hence, many scholars, both of mainland origin and Taiwan, have adopted a wait-and-see attitude and opted to remain in the United States.

For obvious reasons, the NYC survey has not tried to ascertain the scholars' attitudes towards highly sensitive political issues. In any case, I can speak with considerable certainty that, in addition to strong academic, professional, economic, and social "push" factors, political constraints should also be taken into consideration.

To sum up, most students from Taiwan who came for advanced studies have decided to stay in the United States because of the balance of the push-and-pull factors. As Charles V. Kidd has put it so succinctly, "Highly trained persons are not only pulled to the United States, but are also pushed from their own countries."[12] Likewise, C. M. C. Dass' observation on India's brain drain is also quite appropriate here: "Brain goes where brains are, brain goes where money is, brain goes where humanity and justice prevails, brain goes where recognition and healthy competition is assured."[13]

Notes

[1]Chi-ching Liao and Ming-yueh Tang, Research and Analysis on the Employment of the Returned Scholars and Students (Taipei: National Youth Commission, Executive Yuan, 1984), p. 2.

[2]United Nations General Assembly, Outflow of Trained Personnel from Developing Countries, Report of the Secretary-General, November 5, 1968, p. 60.

[3]John R. Niland, The Asian Engineering Brain Drain (Lexington, MA: D. C. Heath and Co., 1970), p. 13.

[4]Shun Yao, A Study on the Chinese Students Abroad, 1960-1979 (Taipei: National Youth Commission, Executive Yuan, 1981), p. 36.

[5]See ibid., pp. 55-56.

[6]Ibid., pp. 56-57.

[7]Ibid., p. 55.

[8]Ibid., pp. 63-64.

[9]Ibid., pp. 74-75.

[10]Ibid., p. 72.

[11]Ibid., p. 75.

[12]The statement by Charles V. Kidd (Executive Secretary, Federal Council for Science and Technology) appears in The Brain Drain into the United States of Scientists, Engineers, and Physicians, A Staff Study for the Research and Technical Programs, Subcommittee of the Committee on Government Operations (Washington, D.C.: U.S. Government Printing Office, 1967), p. 108.

[13]Charles Kao, Brain Drain: A Case Study of China (Taipei: Mei Ya Publications, 1971), p. 37.

Chapter V

COPING WITH THE BRAIN DRAIN

In the past several decades there has been a steady exodus of Taiwan's high-trained manpower to the United States. Taiwan's loss of intellectuals was substantial, because for every 100 college graduates leaving for the United States for advanced studies in a given year during the 1950s and 1960s, on the average, only about six returned home. According to the data released by the Ministry of Education and NYC, during 1950-1969, the annual return of students from study abroad did not exceed 80, a mere 6.1 percent retention rate.[1]

Since 1970, several hundred have returned each year, partly as a result of increasing job opportunities in Taiwan and the active recruitment by its government and private employers. Over the period of 1971-1985, whereas a total of 62,430 students left for foreign study, 11,206 or 18 percent returned (see Table V-1). Although the percentage of the returnees has improved when compared with those of the 1960s, the overall retention rate is still quite low.

Who are these returned scholars, then? According to a published survey, two of the three returned scholars are male; close to 80 percent of them studied in the United States. Moreover, 75.3 percent of them hold master's degrees, while 13.8 percent have doctoral degrees. Their fields of specialization are: engineering,

Table V-1. Chinese Students Going Abroad and Those Who Returned.

Period	Number of Students Going Abroad	Number of Students Returned Home	Return Rate (%)
1971	2,558	291	11.38
1972	2,149	564	26.25
1973	1,966	445	22.63
1974	2,285	486	21.27
1975	2,301	569	24.73
1976	3,641	722	19.83
1977	3,852	624	16.20
1978	4,756	580	12.19
1979	5,801	478	8.24
1980	5,933	640	10.79
1981	5,363	937	17.47
1982	5,925	1,106	18.67
1983	5,690	1,257	22.09
1984	5,410	1,329	24.57
1985[a]	4,800	1,178	24.54
Total	62,430	11,206	17.95

[a]Through October.

Source: National Youth Commission of the ROC, November 1985.

25.9 percent; business, 14.3 percent; science, 12.4 percent; humanities and social sciences, 12 percent; and management, 10 percent.[2]

With regard to the reasons behind their decision to return to Taiwan, their response is rather striking. According to a survey of the returned scholars undertaken by the NYC in 1983, two most cited reasons are highly normative or patriotic, and that reflects a large number of the returned scholars' high national pride and strong identification with Taiwan's developmental goal and desire to be part of it (see Table V-2). The family pressure and social relations (factors ranked 3, 5, 6, 7, and 9 in Table V-2) come as the next strongest reason for returning. Interestingly enough, few admitted that they came back because they were dissatisfied with their job abroad or because they could not find a suitable position abroad.

These findings correspond basically to the survey conducted by Yung Wei. In Wei's study, the respondents' answers to "what is your major reason for coming home" are as follows:[3]

1.	I never thought of staying in the U.S.	32.1%
2.	I have wife and children in Taiwan.	22.1%
3.	My parents wanted me to come home.	5.5%
4.	I was offered an ideal job in Taiwan.	2.8%
5.	I could not find an ideal spouse in the U.S.	2.8%

6.	I was discriminated against in the U.S.	2.8%
7.	I could not find a good job in the U.S.	1.8%
8.	Other reasons	9.1%
		100.0%

Thus, according to Wei, having relatives in Taiwan is an important factor in the returnees' decisions to return home. His investigation revealed that among the 32.1 percent of the returnees who claimed that they never thought of staying in the United States, more than half indicated that they felt very close to their parents.

Wei also pointed out in his study two other important findings. One, income was not the sole concern of the returnees; rather, their satisfaction with the home country is more related to the extent of feeling of importance of their service to the society. Two, the level of satisfaction a returnee has after coming back home is related to such socio-psychological variables as closeness to parents, relationships to coworkers, and self-identified social status.

Where are these returned scholars working? Are they happy? According to the NYC information (see Table V-3), approximately one-third (33.94 percent) of them teaches in the universities and colleges; those who work in the private sectors either established manufacturing/business firms of their own (21.73 percent) or worked for private enterprises (16.04 percent); while the remaining work for

Table V-2. Returned Scholars' Motivations.

Rank	Factors	Persons
1	More meaningful to work in Taiwan	1,068
2	To return is the most appropriate action	841
3	Family's wish	697
4	Suitable position in Taiwan	464
5	To live in my native land and to be near my friends	415
6	Attracted by Taiwan's way of life	345
7	Spouse and children were in Taiwan	166
8	To start a business	106
9	Girl (boy) friend wanted me to return	102
10	Others	97
11	Visa expired	65
12	Sponsored by the government and agreed to return beforehand	40
13	Dissatisfied with the pay of the work abroad	17
14	Temporary work assignment during the summer	7
Total		4,430

Source: Chi-ching Liao and Ming-yueh Tang, Research and Analysis on the Employment of the Returned Scholars and Students (Taipei: National Youth Commission, Executive Yuan, 1984), p. 21.

Table V-3. Statistics of Returned Scholars' Service in Various Institutions.

Organization		Total	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985 (End of Oct.)
Total	N	11,206	291	564	445	486	569	722	624	580	478	640	937	1,106	1,257	1,329	1,178
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Colleges and Universities	N	3,803	152	303	204	219	288	303	289	198	154	162	229	266	361	441	234
	%	33.94	52.53	53.72	45.84	45.06	50.61	41.97	46.31	34.14	32.22	25.31	24.44	24.05	28.72	33.18	19.86
Government Agencies	N	1,235	29	56	53	65	82	81	42	48	57	71	132	131	161	124	103
	%	11.02	9.97	9.93	11.91	13.37	14.41	11.22	6.73	8.28	11.92	11.09	14.09	11.84	12.81	9.33	8.74
Research Organizations	N	828	19	35	31	40	38	34	43	41	32	35	82	100	130	108	60
	%	7.39	6.53	6.21	6.97	8.23	6.68	4.71	6.89	7.07	6.69	5.47	8.74	9.04	10.34	8.13	5.09
Public Enterprises	N	1,107	31	67	80	69	55	77	29	70	29	48	92	182	100	136	42
	%	9.88	10.65	11.88	17.98	14.20	9.67	10.66	4.65	12.07	6.07	7.50	9.82	16.45	7.96	10.23	3.57
Private Enterprises	N	1,798	16	26	33	30	32	46	67	102	48	234	254	196	287	297	130
	%	16.04	5.50	4.61	7.42	6.17	5.62	6.37	10.74	17.59	10.04	36.56	27.11	17.72	22.83	22.35	11.04
Establishing Businesses of Their Own	N	2,435	44	77	44	63	74	181	154	121	158	90	148	231	218	223	609
	%	21.73	15.12	13.65	9.89	12.96	13.01	25.07	24.68	20.86	33.05	14.06	15.80	20.89	17.34	16.78	51.70

Source: National Youth Commission of the ROC, November 1985.

government agencies (11.02 percent), public-owned enterprises (9.88 percent), and research organizations (7.39 percent).

If the survey data of NYC are valid, up to 80 percent of the returned scholars are satisfied with their present jobs, especially with their interpersonal relations, but somewhat dissatisfied with chances of promotion. Those who majored in engineering and medical science are more dissatisfied with their incomes, while those who majored in business and management are quite satisfied. Those who majored in liberal arts and agriculture are more dissatisfied with promotion procedures. In terms of working environment and facilities, those who majored in agriculture are quite satisfied, while those who majored in liberal arts and education are not.

Moreover, in terms of organizations of service, those teaching at universities and colleges feel quite satisfied while those serving with government agencies are not as satisfied. In terms of period of service, the longer they have served at home, the more satisfied they feel.

Governmental Efforts

The survey data and statistics cited in this paper are gathered and compiled by the government organizations in Taiwan. The Republic of China authorities are seriously concerned with the adverse effects of Taiwan's brain drain and have implemented various measures over the past two decades to induce the highly trained

manpower to return and to stay in Taiwan. Taiwan's official policy is twofold: one is to improve and strengthen the institutions of higher learning at home; the other is to encourage Taiwan's "brain" in the United States to remigrate and/or contribute their talents and knowledge to Taiwan's national development. Since the early 1970s, the ROC government has set up the NYC, a cabinet-level government office, and other organizations to recruit Taiwan's scholars abroad and carry out related programs. What follows below is based primarily on the information provided by the NYC.

(1) Travel Subsidy: In the past, the Republic of China Ministry of Education and, since the 1970s, the NYC have provided air travel allowances to the returning scholars and their dependents.

(2) Job Placement: One major function of the NYC is to help recruit Taiwan's scholars overseas--it renders assistance to those scholars abroad seeking employment in Taiwan and to domestic employers seeking highly educated personnel from abroad. The services the NYC provides are as follows:

(a) Recommendation: It refers the applicants to the potential employer organizations based upon their preference and specialties. These organizations include government agencies, government and private universities and colleges, government and private corporations, private bodies, and foreign concerns.

(b) An Information Clearinghouse: Each month, the NYC compiles information on the returned scholars who seek employment and

distributes information in the form of newsletters, free of charge, to potential employers, totaling over 2,500 firms. Likewise, each year, the NYC compiles and publishes a bulletin on "manpower of master and higher degrees wanted" and distributes it overseas. Such information is also published in international editions of Central Daily News, Overseas Scholars Monthly, Sinorama, and the NYC house journal, Bulletin of Overseas Center, to publicize job opportunities available in Taiwan.

(c) The Computer System: Since 1983, all education and career background information of returning students has been entered into a computer system. In the first half of 1986, the NYC had further added information on 3,000 leading private enterprises, government agencies, government-run corporations, universities/colleges, and research institutions into a computer. This has proven to be highly helpful for returning scholars to locate and contact potential employers.

(d) "The Scientist Pool": Before the returned scholars can find suitable permanent jobs, they are given short-term (one-year) research appointments. Since 1979, 50 such temporary appointments have been made each year, and the number was increased to 75 in 1986, and is to be increased to 100 in 1989. Funding for the program has been provided by the National Science Council as a means of encouraging the return of highly trained talent and of helping them to tide over before permanent jobs are available.

(3) Business Investment Assistance: For overseas professionals in science and engineering who wish to establish businesses in Taiwan and import new technology, the NYC provides assistance in obtaining loans, production locations, and facilities. To request a loan recommendation from the Commission, one has to submit a business-founding plan. If the application is approved, it is passed on to a relevant bank along with the Commission's recommendation. The funds are provided by the Sino-American Economic and Social Fund, Bank of Taiwan, Cooperative Bank, City Bank of Taipei, and other financial organizations. An individual may apply for a business-founding loan for an amount of up to NT $1,000,000 (US $1 = NT $30). That amount includes NT $400,000 in credit loans.

(4) Visiting Professors and Experts: Knowing that many scholars, scientists, and specialists of Chinese or Taiwanese origin would not reemigrate, but that their expertise and knowledge are highly valuable to Taiwan, the Republic of China authorities have over the years adopted special measures (including a high salary) to induce them to teach or work in Taiwan for a short period. Under the auspices of the National Science Council and Ministry of Education, more than 3,700 overseas mature scientists and experts and 2,500 established scholars have returned as "visiting professors" or "visiting research professors."

(5) Program to Step Up Recruitment: In view of the serious shortage of high-level manpower to meet the urgent demand of national

reconstruction, the Executive Yuan (Cabinet), in 1983, promulgated a new program to step up the recruitment of hi-tech experts abroad, which has been implemented through long-term and short-term efforts from both the government and private sectors. The project is mainly intended to attract and hire overseas experts who have considerable experience and already had significant achievements in their professions to begin their "second careers" at home, in contrast with other measures which are aimed mainly at new master's and doctoral degree-holders abroad. The government efforts to enlist such well-experienced and sophisticated experts include the following:

(a) To Pay Competitive Salaries: The recruits are offered almost the same pay they get abroad. If formal pay is insufficient, allowances for research or house rentals are given so as to narrow down the gap of pay given in Taiwan and abroad.

(b) Improvement of Working Conditions: Improvement of working environment of teaching and research facilities and upgrading of instruments and equipment is provided where possible.

(c) Better Housing Facilities: Those who return to engage in teaching or research or serve at Hsinchu Science-Based Industrial Park are provided with free housing or given financial assistance if they choose to purchase a house.

(d) Children's Schooling: Assistance in children's schooling is provided.

(6) National Development Conference: The National Development Conference has been held in Taipei 14 times since 1972 and more than 3,000 overseas scholars and professionals have participated in it at the government's expense. This conference organizes panel discussions for government officials, scholars, and professionals at home on topics related to economic development, science and technology development, social welfare, politics, culture and education, etc. This is a rather inexpensive way to pick the brain of Taiwan's scholars and experts abroad, and a highly successful public relations operation also.

(7) Links with Overseas Professionals: Since 1975, the NYC has collected and established files of overseas Chinese scholars and professionals. This information is passed on to domestic academic and research organizations and industries to help them in the recruitment of high-level scientists and specialists. Beyond this, the Commission also helps Taiwan's overseas scholars organize more than 20 professional societies and conduct academic conferences annually with an aim to promote academic exchange and mutual cooperation between foreign and domestic scholars. The NYC sends officials, scholars, and professionals from Taiwan to attend these conferences. The meetings provide the opportunity for exchange of knowledge and technical information, technology transfer to Taiwan, and recruitment of Taiwan's experts from abroad.

Due to a combination of factors (e.g., a decline in the U.S. job market, change of the U.S. immigration regulations, and the emergence of new employment opportunities in Taiwan), over 1,000 persons have returned to Taiwan from abroad each year since 1982. However, the efforts of the Republic of China authorities to recruit high-level scientific manpower abroad continue relentlessly. This is in part because the demand for highly trained personnel increases steadily, and the training and the specialties of the returnees do not meet with the local demand, as indicated below.

In recent years, more and more government agencies as well as private organizations want to employ those holding doctorate degrees. According to a NYC survey in 1984, there were 389 reported job vacancies which required the applicants to hold doctorate degrees; the number increased to 461 in 1985 and 796 in 1986, respectively.[4] On the other hand, applicants with doctorate degrees only numbered 179 in 1984, 211 in 1985, and 235 in 1986. Meanwhile, there has been a huge oversupply of master's degree applicants.

Likewise, there has been a heavy demand for those who majored in engineering. In the past year, over half of the total reported vacancies were in the engineering fields, but there were very few engineers among the returning scholars. On the other hand, those majoring in medicine and agriculture roughly met the demand, but there was an oversupply of those who majored in humanities and social sciences.

Concluding Remarks

In spite of Taiwan's considerable brain drain, Taiwan's economic development in the past two decades has been remarkable and does not seem to have been affected by the loss of talent. Why is that the case? Is Taiwan's brain drain exaggerated? Were the warnings of its dire consequences a false alarm?

To answer these questions, two things should be pointed out. First, Taiwan's brain drain into the United States is primarily a case of "education and migration"; namely, it is an outflow of college graduates, not an exodus of high-class scientists and engineers. In view of this fact, Taiwan's manpower loss in the short run is not as serious as the case where mature and experienced scientists and professionals leave. Furthermore, whereas a large number of college graduates leave each year to study abroad, a much larger number of the graduating class do remain in Taiwan; hence, one must take this into consideration when calculating the manpower loss.

We should also explain why the Republic of China government continued to permit students from Taiwan to leave for the United States to study when most did not return. First of all, there seems to be a basic consensus among the decision makers that sending the students to the United States for advanced studies has been a wise policy, in terms of Taiwan's need to train high-level manpower for national development and in terms of cost, as Taiwan did not and still

does not have sufficient academic facilities and strong graduate degree-granting programs to enroll all the applicants, as pointed out previously. Second, a high percentage of Taiwan's students in the United States are known to have regularly remitted money to Taiwan to support their families and have thus become Taiwan's foreign exchange earners.

But there are other reasons which, over time, have become more important. Economically, Taiwan depends on the United States to supply capital, technology, and industrial raw materials, and the United States has been Taiwan's largest market (approximately 45 percent of Taiwan's annual exports head for the United States). Given such economic realities, it would not serve any useful purpose for the authorities to disrupt the movement of Taiwan's college graduates to the United States. Politically, Taiwan's young people have come to see studying abroad as a matter of their human rights. Likewise, the authorities tend to see Taiwan's students abroad as unofficial envoys who eventually develop valuable academic and personal ties with the American people and institutions and win American friendship and support for Taiwan. Although Taiwan does suffer from brain drain, the authorities seem to consider that as a necessary "evil" and an acceptable price to pay for other more important gains.

Now that Taiwan is undergoing the transformation from a labor-intensive economy to one based on high technology and from a

newly industrialized country to a developed country, it will depend heavily and more than ever on high-quality personnel and intellectual resources. As pointed out above, there is already a shortage of high-level manpower and the shortage will become more acute in the years to come in view of Taiwan's ongoing modernization drive. Taiwan's further progress in economic development and further prosperity will hinge on Taiwan's success reversing the brain drain and recruiting its highly trained talents abroad.

Notes

[1]Chi-ching Liao and Ming-yueh Tang, Research and Analysis on the Employment of the Returned Scholars and Students (Taipei: National Youth Commission, Executive Yuan, 1984), p. 2.

[2]Ibid., p. 79.

[3]Yung Wei, "Socio-psychological Variables and Inter-nation Intellectual Migration: Findings from Interviewing Returnees in the Republic of China," International Studies Association (Comparative Interdisciplinary Studies Section), Working Paper 15, December 1974, p. 27.

[4]National Youth Commission, A Helping Hand to Overseas Scholars for Their Service at Home (Taipei: National Youth Commission, October 1987), pp. 5-6.

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